

UNCLASSIFIED
AD 414628

DEFENSE DOCUMENTATION CENTER
FOR
SCIENTIFIC AND TECHNICAL INFORMATION
CAMERON STATION, ALEXANDRIA, VIRGINIA



UNCLASSIFIED

NOTICE: When government or other drawings, specifications or other data are used for any purpose other than in connection with a definitely related government procurement operation, the U. S. Government thereby incurs no responsibility, nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use or sell any patented invention that may in any way be related thereto.

.

63-4-5

FTD-TT- 63-648

CATALOGED BY DDC

AS AD No 414628

414628

TRANSLATION

LIGHT COUNTS OF KILOMETERS

By

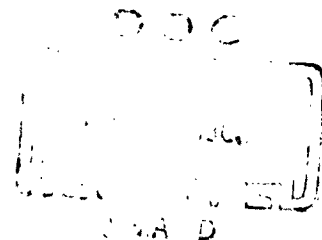
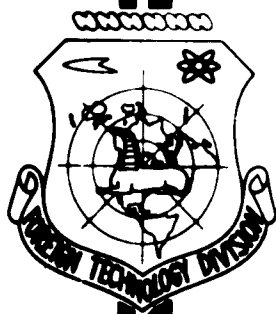
Rudolf Svoren'

FOREIGN TECHNOLOGY DIVISION

AIR FORCE SYSTEMS COMMAND

WRIGHT-PATTERSON AIR FORCE BASE

OHIO



UNEDITED ROUGH DRAFT TRANSLATION

LIGHT COUNTS OF KILOMETERS

BY: Rudol'f Sveron'

English Page: 3

SOURCE: Russian Newspaper, Sovetskaya Kirgisiya,
15 November 1962, p. 4,

THIS TRANSLATION IS A RENDITION OF THE ORIGINAL FOREIGN TEXT WITHOUT ANY ANALYTICAL OR EDITORIAL COMMENT. STATEMENTS OR THEORIES ADVOCATED OR IMPLIED ARE THOSE OF THE SOURCE AND DO NOT NECESSARILY REFLECT THE POSITION OR OPINION OF THE FOREIGN TECHNOLOGY DIVISION.

PREPARED BY:

TRANSLATION SERVICES BRANCH
FOREIGN TECHNOLOGY DIVISION
WP-AFB, OHIO.

LIGHT COUNTS OF KILOMETERS

by
Rudolf Svoren'

Just imagine, you have to measure a distance of 100 m with an accuracy of up to one centimeter. And if with the same accuracy you would be asked to measure one kilometer or even 10 km. It is difficult. But the problem can be solved rapidly and very simply. We will be aided in this respect by the new measuring instrument ZCD-1- and electro-optical range finder. It was developed at the Central Scientific Research Inst of Geodesy, aerial photography and cartography and is already now in series manufacture. The instrument measures greater distances with striking accuracy. And so for example, determining a length of 25-30 km it errs by not more than 3-4 cm.

By its mode of operation the instrument is altogether ^{not} similar to conventional range finders - it rather resembles a radar set. The basic difference here lies in the fact that instead of radio waves the range finder uses a beam of light. With the aid of an optical system the beam is focused on that point of the locality, the distance to which has to be measured. Here is first set up a reflector, a kind of a mirror. It consists of 133 miniature "fragments" with an individual lens placed in front of each. This system traps the light beam and reflects it back to the instrument. All this represents a child's play with solar light spots. With the one exception, that not even one, even the smartest youngster, can strike the target with the light spot, a target situated at a distance of several tens of kilometers, and by using a complex honeycombed reflector, such an accuracy can be derived quite simply.

And so, having made the trip to the reflector and back, the light beam has again fallen into the instrument. But how can one find what distance it has covered?

It is known that the speed of light is 300000 km/sec. ^{And} since we know with what

speed light travels all we have to do is figure out how much time the journey has consumed. These data will enable us to calculate to what the covered path equals. But not one even most perfect chronometer can read time with a degree of accuracy needed by us. Such a problem is relatively easily solved by radio electronic devices.

In the transmitting part of the range finder is situated an electronic oscillator which periodically, at strictly defined frequency, changes the brightness of the emitted light. Having returned from its short trip the light falls into the receiving part of the instrument and is immediately trapped by a photo element. It transforms the changing in brightness light spot into an alternating electric current. From then on begin purely radiotechnical operations - the alternating currents of transmitter and receiver are compared, by the results is figured out the number of oscillations, which succeeded in realizing the current at the time, when the beam "ran" to the reflector and back. This number, like the number of oscillations of a pendulum in ordinary clocks, given an accurate time reading.

We told about the operation of an electro-optical range finder but only in most general outlines. In fact the entire operation is much more difficult and at the same time much simpler. Difficult because, in the instrument must be carried out a series of precision additional functions, particularly, the frequency of the oscillator-pendulum must be changed smoothly, it must be rigidly stabilized, to carry out measurements on two different frequencies, amplify the weak reflected light signal. And the simplicity lies in the fact, that in the process of measuring, the operator handling the instrument, needs not make any difficult calculations or cumbersome computations - all this is done by precision electronic instruments. The entire process of reading distance takes not more than 10-12 minutes.

DISTRIBUTION LIST

DEPARTMENT OF DEFENSE	Nr. Copies	MAJOR AIR COMMANDS	Nr. Copies
		AFSC	
		SCFDD	1
		DDC	25
		TDBTL	5
HEADQUARTERS USAF		TDEOP	2
		TDEEC (Burton)	1
AFCIN-3D2	1	AKDC (AKY)	1
ARL (ARB)	1	AFWL (WLP)	1
		APGC (PGP)	1
		ASD (ASYLM)	2
		ESD (BSF)	1
		ESD (BSY)	1
OTHER AGENCIES		RADC (RAY)	1
		SSD (SSF)	2
CIA	1		
NSA	6		
DIA	6		
AID	2		
OTS	2		
AEC	2		
PWS	1		
NASA	1		
ARMY (FSTC)	3		
NAVY	3		
NAFEC	1		
AFCHL (CRCLR)	1		
RAND	1		